

Remarks

Claims 1 to 3, 5, 6, and 9 were rejected under 35 U.S.C. 102(b) as anticipated by Michalski et al. ("Michalski"). Michalski treats "contaminated phosphoric acid plant pond water." (Abstract) Michalski states (column 3, line 23) that "pond water is a saturated solution." Applicant treats sea water and all of Applicant's claim now require the use of sea water. Milchalski cannot anticipate Applicant's amended claims as Milchalski does not disclose using his process to treat sea water.

The salts in sea water are very different from the salts in Michalski's pond water.

The following table compares what Michalski gives (column 2, lines 6 to 19) as an example of "the chemical components that could be found in pond water" with "the typical sea water international standard from Wormly, England" that Applicant presents in Paragraph [0012] of his application.

CHEMICAL COMPONENT	RANGE OF CONCENTRATION (ppm)	
	POND WATER	SEA WATER
Cl	—	19,400
Na	1200 – 2500	10,700
P	1700 – 12,000	—
SO <sub>4</sub>	4300 – 9600	2,700
F	200 – 15,000	—
Si	100 – 4100	—
N	40 – 1500	—
Mg	160 – 510	1300
Ca	450 – 3500	400
HCO <sub>3</sub>	—	120
K	80 – 370	380
Fe	5 – 350	—
Al	10 – 430	—
Cl	10 – 300	—
CO <sub>3</sub>	—	<2

As the table shows, Milchalski's pond water is completely different from sea water. The main component of Milchalski's pond water is phosphorus, whose concentration is so low in sea water that it is not even listed. The main component of sea water is sodium chloride. Since chlorine is the very last component listed for Michalski's pond water, sodium chloride can be only a very minor component of Milchalski's pond water. It is not obvious to substitute sea water for Milchalski's pond water because they are chemically very different.

Milchalski's objective is to recover as much of the phosphorus in the pond water as possible. For Milchalski, phosphorus is the most valuable component and his process is designed to isolate it. In contrast, in Applicant's invention it is the water that is the most valuable component and Applicant's process seeks to isolate it. Milchalski is not concerned with purifying the water, as long as he is able to purify the phosphorus. Applicant is not concerned with purifying the salts, as long as he is able to purify the water. It is not obvious to apply Michalski's process to Applicant's problem as Michalski's process is not directed at solving Applicant's problem.

As to Claim 6, this claim requires desalinating to produce two streams, one having a higher concentration of dissolved solids than the other. Applicant cannot find a disclosure of that in Michalski and respectfully requests the Examiner to cite the column and lines in Michalski where that is disclosed. Claim 6 further requires forming a mixture of the higher concentration stream and the sea water being treated, adjusting

the concentration of the compound in that mixture, if necessary, and recycling that mixture to step (B) in Claim 1. Applicant cannot find in Michalski any disclosure of those three steps.

Claims 1 to 10, 12 to 15, and 18 were rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson in view of Hsiung or Al-Samadi. Like Michalski, Anderson is not treating sea water. Anderson treats “saline water such as agricultural drain waters or industrial waste waters” (column 1, lines 32 to 33). Elsewhere, Anderson states that saline water “can be agricultural drain water, brackish water and the like, which generally has a dissolved salts content no greater than about 10,000 ppm” (column 3, lines 15 to 18). Note the above table, where the salt content of standard sea water has more than twice the salt content of Anderson’s saline water.

Anderson further states (column 3, lines 18 to 21), “Waters which have greater salt contents and, in particular, sea water, which also has a disproportionately high magnesium content, can not be readily treated by this process ...” Thus, Anderson himself states that his process cannot be used to treat sea water. How can it be obvious to use Anderson’s process to treat sea water when Anderson says that it “can not be readily treated” with his process?

Furthermore, Anderson adds magnesium hydroxide to the water (column 3, lines 33 to 38), but Applicant’s claims require the addition of “a compound selected from the group consisting of sodium hydroxide, sodium carbonate, potassium hydroxide, potassium carbonate, calcium hydroxide, calcium carbonate, aluminum hydroxide,

aluminum sulfate, aluminum potassium sulfate, and mixtures thereof," none of which are suggested by Anderson. Moreover, Anderson adds magnesium hydroxide but in Applicant's claimed process magnesium hydroxide is not added; it is only precipitated. ("This precipitate is believed to consist of magnesium carbonate, magnesium hydroxide, sodium bicarbonate, and sodium chloride" Paragraph [000026]) It is not obvious for Applicant to remove a compound that Anderson teaches to add.

The Examiner states, "... one skilled in the art, based on Anderson's disclosure [it] would have been motivated to alternatively use calcium hydroxide in the first precipitation step, e.g. to remove magnesium and sulfates as calcium sulfate." Applicant does not agree. Applicant can find nothing in "Anderson's disclosure" that would motivate "one skilled in the art" to use calcium hydroxide in the first precipitation step. The Examiner is respectfully requested to cite the column and lines in Anderson that would provide this motivation. Anderson's entire patent is limited to magnesium hydroxide and he never suggests that a compound other than magnesium hydroxide could be used. Moreover, Anderson adds the magnesium hydroxide to precipitate calcium. Why would Anderson add calcium when he wants to precipitate calcium?

As to Applicant's Claim 6, the Examiner refers to column 8, third paragraph, of Anderson. As explained hereinabove, Claim 6 requires the desalination to produce two streams having different salt concentrations. In his Figures 1 and 2, Anderson has a desalination step 34 which forms a water stream 36 and a brine stream 38. Brine stream 38 would be a more concentrated second steam. Applicant's Claim 6 states, "a

mixture is formed of said second stream and said sea water containing dissolved salts."

Anderson does not show that step. First, of course, Anderson uses "saline water," not sea water, which has a very different composition. Anderson says his process won't work on sea water and never suggests any substitute compounds that would make it work on sea water.

But also, instead of forming a mixture of his saline water in line 10 and his brine in line 38, he instead mixes his brine in line 38 with calcium hydroxide in line 42, which precipitates magnesium hydroxide in setting step 50 (column 7, lines 6 to 8). The precipitated magnesium hydroxide is then recycled to first treatment step 12 (column 7, lines 13 to 18). That is very different from the steps required by Applicant's Claim 6 and it is not obvious to completely alter what Anderson is doing to meet the requirements of Applicant's Claim 6.

Applicant's Claim 14 specifies exactly what compounds are to be used in the two precipitation steps and the amounts to be used: "about 0.04 to about 40 g/L of calcium hydroxide, calcium oxide, or a mixture thereof" for the first precipitation and "about 0.1 to about 60 g/L of sodium carbonate and about 0.04 to about 40 g/L of sodium hydroxide, or a mixture thereof" for the second precipitation. Anderson uses magnesium hydroxide for his first precipitation and a flocculant (e.g., polyacrylamide, column 4, lines 41 to 43) for his second precipitation. Applicant fails to understand how it can be obvious to use two completely different compounds, as Claim 14 requires.

Hsiung and Al-Samadi treat hard water, not sea water, and are not especially

relevant.

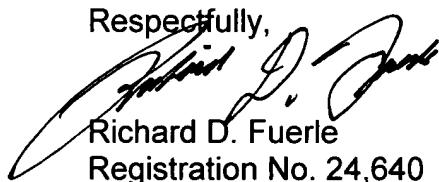
Claims 14 to 17, and 19 to 20 were rejected under 35 U.S.C. 103(a) as being unpatentable over Michalski as applied to Claim 1 further in view of Anderson in view of Hsiung or Al-Samadi. Applicant has hereinabove commented on these references. His only additional comment is that Michalski treats "Phosphoric Acid Plant Pond Water" (title), Anderson treats "agricultural drain waters or industrial waste waters" (column 1, lines 32 to 33), and Hsiung and Al-Samadi treat hard water. Their processes are specifically designed to treat water that contains very different chemicals in very different proportions. It is not obvious that a process designed to treat hard water (Hsiung and Al-Samadi), which contains low concentrations of calcium and magnesium salts, or water that contains agricultural fertilizers and pesticides or industrial chemicals (Anderson), can be applied to the pond water from a phosphoric acid plant (Michalski). And even if it were obvious to combine these references, the combination would still not fall within the scope of Applicant's claims as none of the references teach treating sea water.

Claims 11 was rejected under 35 U.S.C. 103(a) as being unpatentable over Michalski as applied to Claim 1 and/or Anderson in view of Hsiung or Al-Samadi, further in view of Tonelli et al. ("Tonelli"). Applicant has hereinabove commented on Michalski, Anderson, Hsiung, and Al-Samadi. Tonelli treats "surface water such as river water and water from reservoirs and lakes." (Column 7, lines 53 to 55) He does not treat sea water. Tonelli was cited to show heating during the desalination step. While, as the

Examiner notes, Tonelli does disclose heating to as high as 75°F, Applicant's Claim 11 requires a temperature of at least 70°C, which is 158°F. Thus, Tonelli does not teach using a temperature even close to the temperature required by Applicant's Claim 11. Moreover, Tonelli states (column 11, lines 49 to 51), "That is, it has been discovered that purity or resistivity increases as the temperature is decreased." In other words, Tonelli teaches against using the high temperatures required by Applicant's Claim 11; therefore Tonelli is evidence for the unobviousness of Claim 11.

All of the claims are now believed to be allowable over the references cited and reconsideration and allowance of all of the claims are therefore requested. Should the Examiner still have objections to the application that need to be corrected he is invited to call Applicant's attorney at (716) 774-0091 to resolve any remaining problems.

Respectfully,



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December 9, 2005  
CASE MH01